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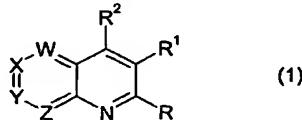
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**(54) Title: FUNGICIDES BASED ON NITROGEN-CONTAINING HETEROCYCLES**



**(57) Abstract:** Fungicidal compounds having the general formula (1): formula (1) wherein W, Z and one of X and Y are N and the other one of X and Y is CR<sup>8</sup>; R<sup>8</sup> is H, halo, C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy, C<sub>1-4</sub> alkylthio or halo(C<sub>1-4</sub>)alkyl; R and R<sup>2</sup> are independently H, halo, C<sub>1-8</sub> alkyl, C<sub>1-8</sub> alkoxy, C<sub>1-8</sub> alkylthio, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, cyano or NR<sup>3</sup>R<sup>4</sup>, provided that at least one of R and R<sup>2</sup> is NR<sup>3</sup>R<sup>4</sup>; R<sup>1</sup> is halo, C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, C<sub>3-8</sub> cycloalkyl, C<sub>3-8</sub> cycloalkyl(C<sub>1-6</sub>)-alkyl, C<sub>1-8</sub> alkoxy, C<sub>1-8</sub> alkylthio, aryl, aryloxy, arylthio, heteroaryl, heteroaryloxy, heteroarylthio, aryl(C<sub>1-4</sub>)alkyl, aryl(C<sub>1-4</sub>)alkoxy, heteroaryl(C<sub>1-4</sub>)alkyl, heteroaryl(C<sub>1-4</sub>)alkoxy, aryl(C<sub>1-4</sub>)alkylthio, heteroaryl(C<sub>1-4</sub>)alkylthio, morpholino, piperidino or pyrrolidino; R<sup>3</sup> and R<sup>4</sup> are independently H, C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, aryl, aryl(C<sub>1-8</sub>)-alkyl, C<sub>3-8</sub> cycloalkyl, C<sub>3-8</sub> cycloalkyl(C<sub>1-6</sub>)-alkyl, heteroaryl, heteroaryl(C<sub>1-8</sub>)alkyl, NR<sup>5</sup>R<sup>6</sup>, provided that not both R<sup>3</sup> and R<sup>4</sup> are H or NR<sup>5</sup>R<sup>6</sup>, or R<sup>3</sup> and R<sup>4</sup> together form a C<sub>3-7</sub> alkylene or C<sub>3-7</sub> alkenylene chain optionally substituted with one or more C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy groups, or, together with the nitrogen atom to which they are attached, R<sup>3</sup> and R<sup>4</sup> form a morpholine, thiomorpholine, thiomorpholine S-oxide or thiomorpholine S-dioxide ring or a piperazine or piperazine N-(C<sub>1-4</sub>)alkyl (especially N-methyl) ring; and R<sup>5</sup> and R<sup>6</sup> are independently H, C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, aryl, aryl(C<sub>1-8</sub>)alkyl, C<sub>3-8</sub> cycloalkyl, C<sub>3-8</sub> cycloalkyl(C<sub>1-6</sub>)-alkyl, heteroaryl or heteroaryl(C<sub>1-8</sub>)alkyl; any of the foregoing alkyl, alkenyl, alkynyl or cycloalkyl groups or moieties (other than for R<sup>8</sup>) being optionally substituted with halogen, cyano, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkylcarbonyl, C<sub>1-6</sub> alkoxy carbonyl, C<sub>1-6</sub> haloalkoxy, C<sub>1-6</sub> alkylthio, tri(C<sub>1-4</sub>)alkylsilyl, C<sub>1-6</sub> alkylamino or C<sub>1-6</sub> dialkylamino, any of the foregoing morpholine, thiomorpholine, piperidine, piperazine and pyrrolidine rings being optionally substituted with C<sub>1-4</sub> alkyl (especially methyl), and any of the foregoing aryl or heteroaryl groups or moieties being optionally substituted with one or more substituents selected from halo, hydroxy, mercapto, C<sub>1-6</sub>alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>1-6</sub> alkoxy, C<sub>2-6</sub> alkenyloxy, C<sub>2-6</sub> alkynyoxy, halo(C<sub>1-6</sub>)-alkyl, halo(C<sub>1-6</sub>)-alkoxy, C<sub>1-6</sub> alkylthio, halo(C<sub>1-6</sub>)-alkylthio, hydroxy(C<sub>1-6</sub>)-alkyl, C<sub>1-4</sub> alkoxy(C<sub>1-6</sub>)-alkyl, C<sub>3-6</sub> cycloalkyl, C<sub>3-6</sub> cycloalkyl(C<sub>1-6</sub>)-alkyl, phenoxy, benzyloxy, benzyloxy, cyano, isocyanato, thiocyanato, isothiocyanato, nitro, -NR<sup>7</sup>R<sup>8</sup>, -NHCOR<sup>9</sup>, -NHCONR<sup>10</sup>R<sup>11</sup>, -CONR<sup>12</sup>R<sup>13</sup>, -SO<sub>2</sub>R<sup>14</sup>, -OSO<sub>2</sub>R<sup>15</sup>, -COR<sup>16</sup>, -CR<sup>17</sup>=NR<sup>18</sup> or -N=CR<sup>19</sup>R<sup>20</sup>, in which R<sup>7</sup> and R<sup>8</sup> are independently hydrogen, C<sub>1-4</sub> alkyl, halo(C<sub>1-4</sub>)-alkyl, C<sub>1-4</sub> alkoxy, halo(C<sub>1-4</sub>)-alkoxy, C<sub>1-4</sub> alkylthio, C<sub>3-6</sub> cycloalkyl, C<sub>3-6</sub> cycloalkyl(C<sub>1-4</sub>)-alkyl, phenyl or benzyl, the phenyl and benzyl groups being optionally substituted with halogen, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy.

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